

UKMO/JPL Discussion 2010.

Eric Larour¹, Eric Rignot^{2,1}, H  l  ne Seroussi^{1,3} and
Mathieu Morlighem^{1,3}

¹ Jet Propulsion Laboratory – California Institute of technology

² Ecole Centrale Paris, MSS-MAT, France

³ University of California Irvine

C31B-02

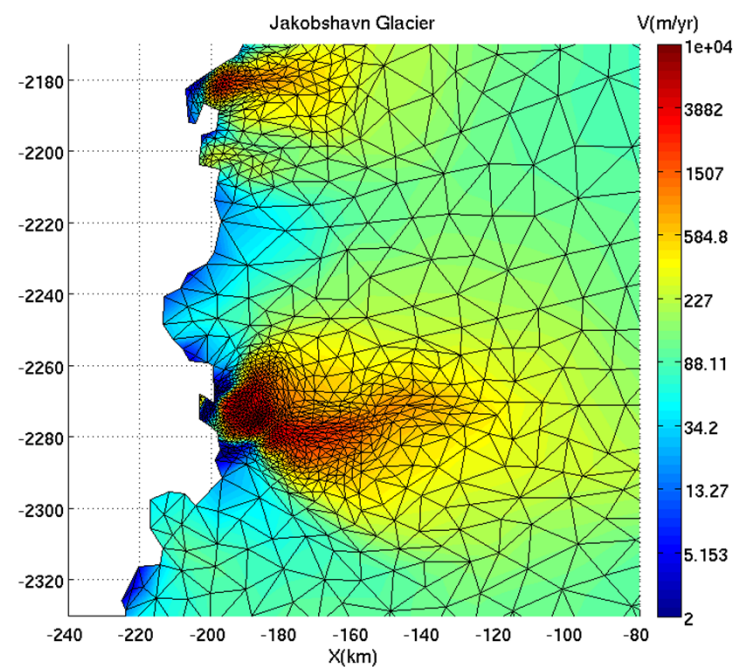
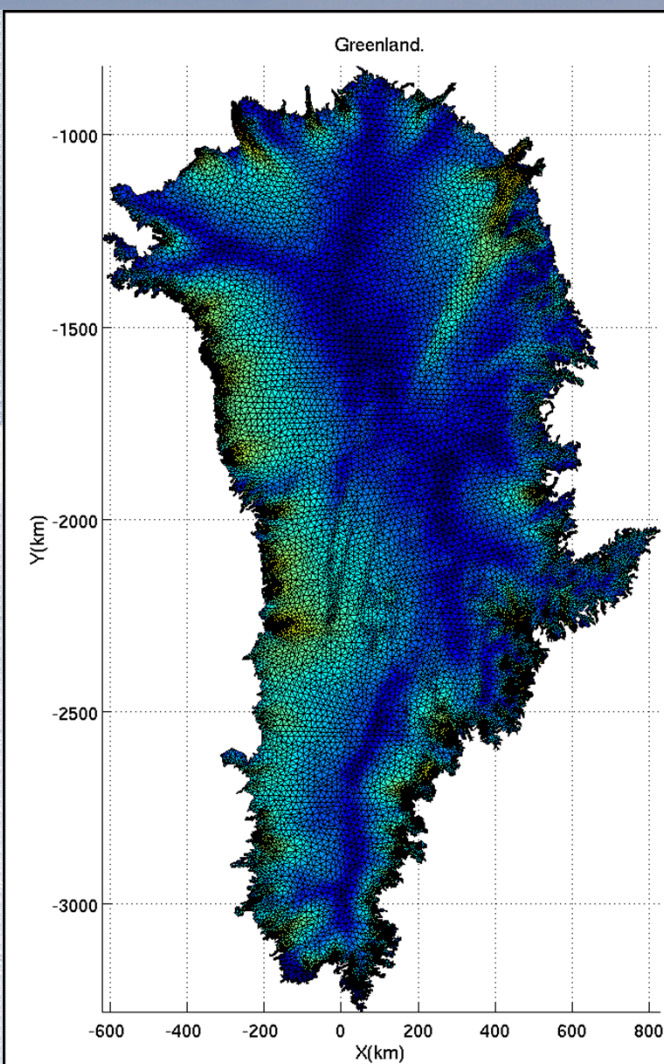


ISSM Capabilities.

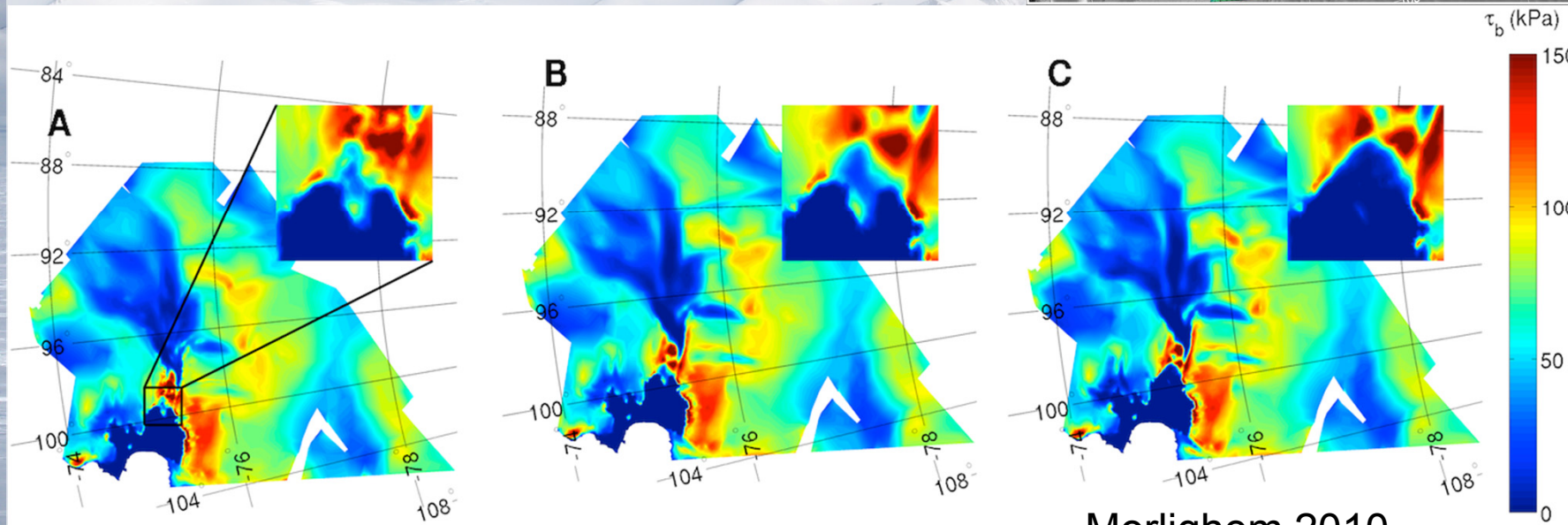
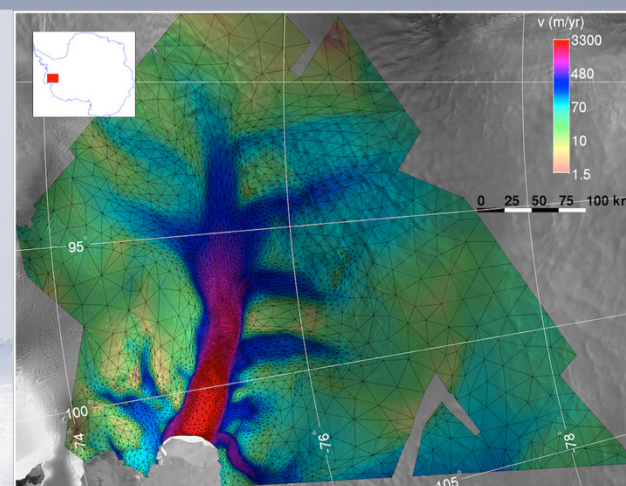
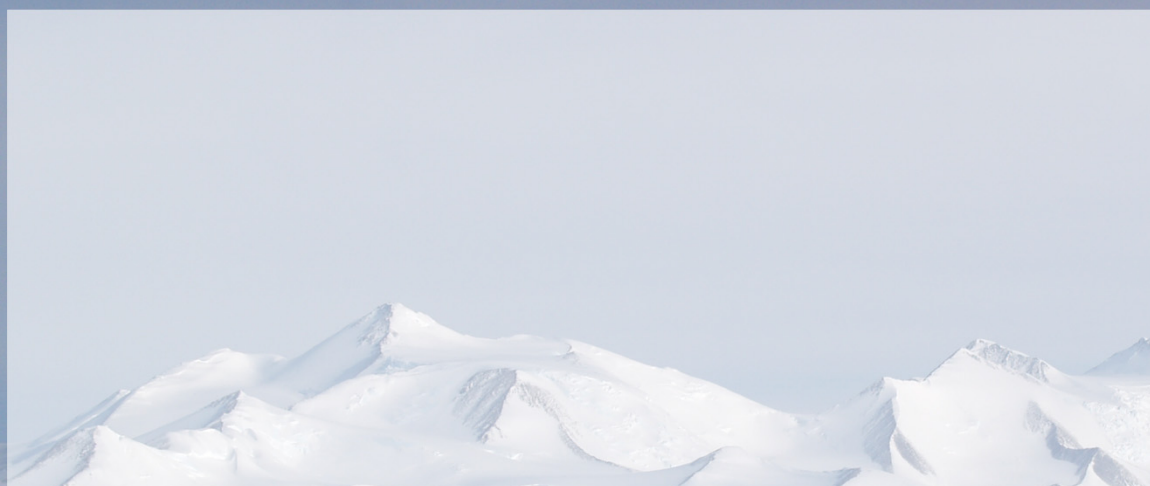


- ISSM: Ice Sheet System Model.
- Large Scale Finite Element Ice Flow Model.
 - Anisotropic meshing.
 - 2D,3D higher order and 3D full-Stokes
 - Lower-Higher order coupling.
 - Data assimilation:
 - Assimilate basal drag and ice rheology using surface velocities.
 - Assimilate thickness and surface velocities to spin-up transient flow models.
 - Sensitivity Analysis using Dakota core.
 - Ice/Ocean coupling being developed.
 - Melting rates under ice shelves modeled by GCM
 - Ice shelf geometry modeled by ISSM.
 - Strong coupling.
 - Ice/Atmosphere coupling within Climate Research Center Initiative.

Anisotropic Meshing.



2D,3D,3D full-Stokes

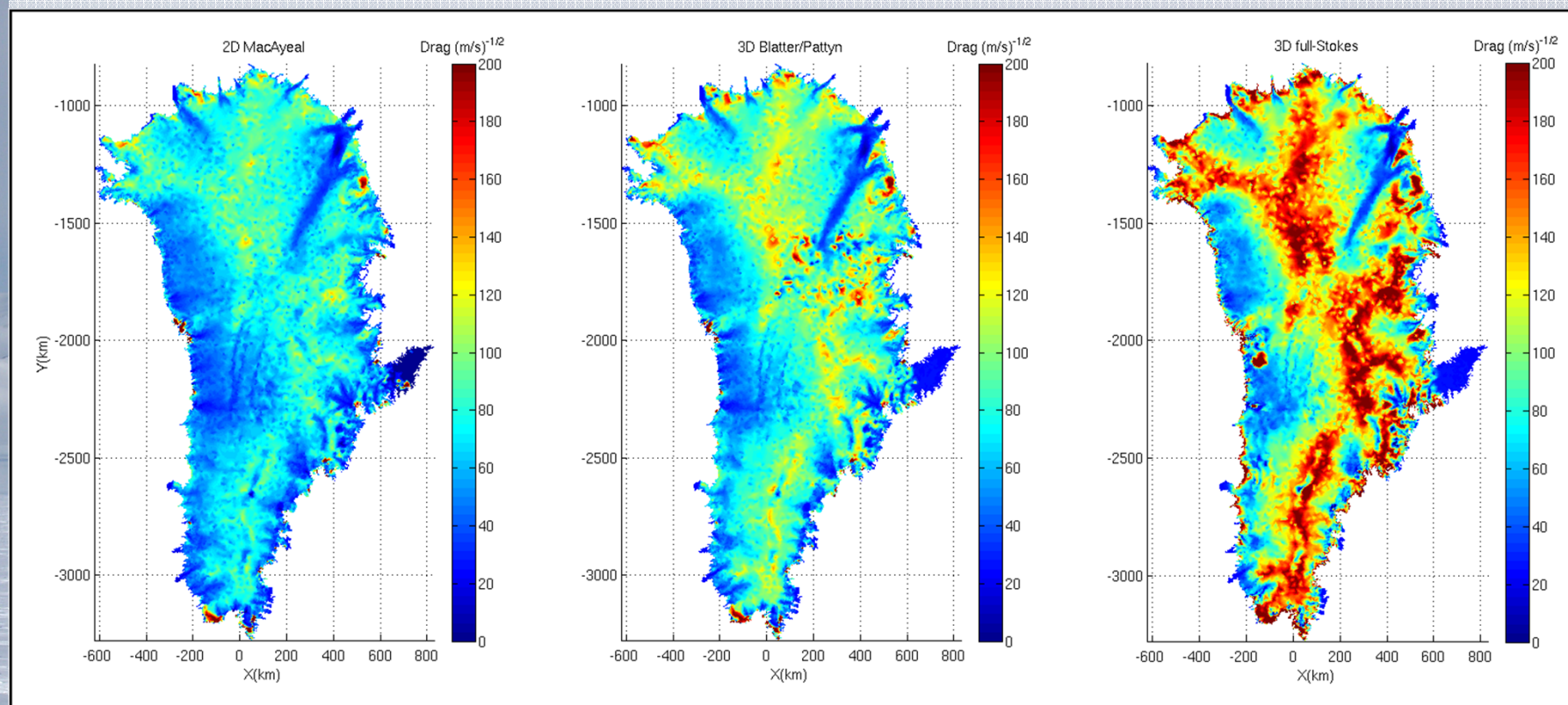


December 15th, 2010

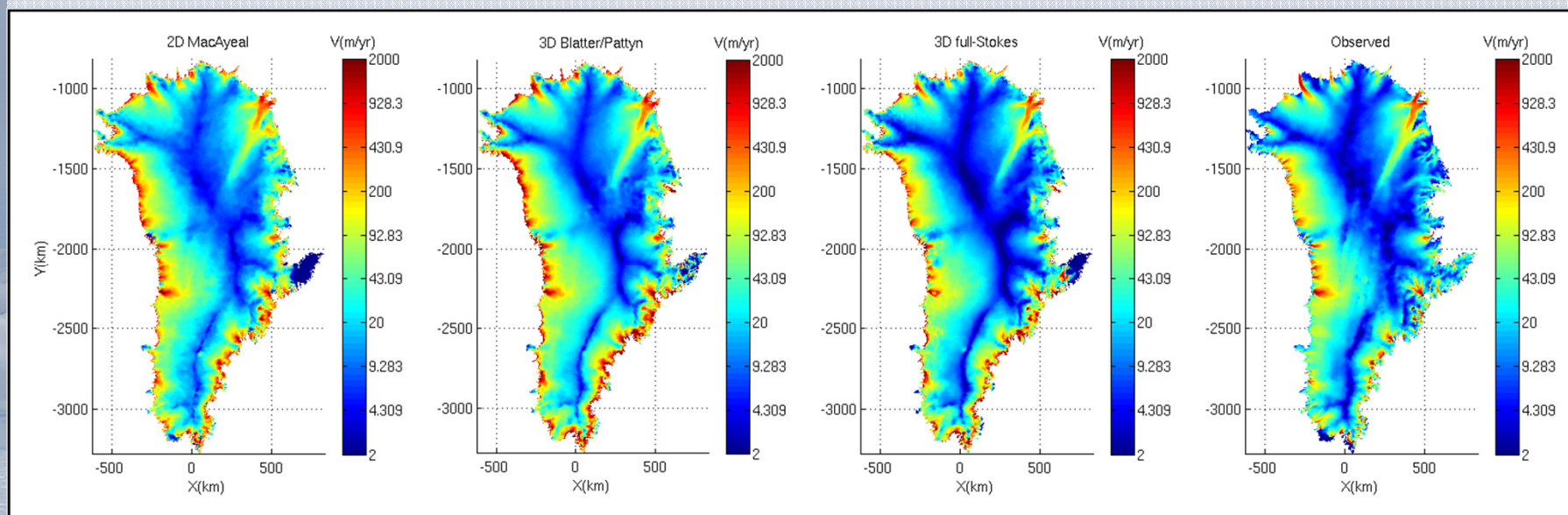
ISSM – AGU Fall meeting 2010

Morlighem 2010

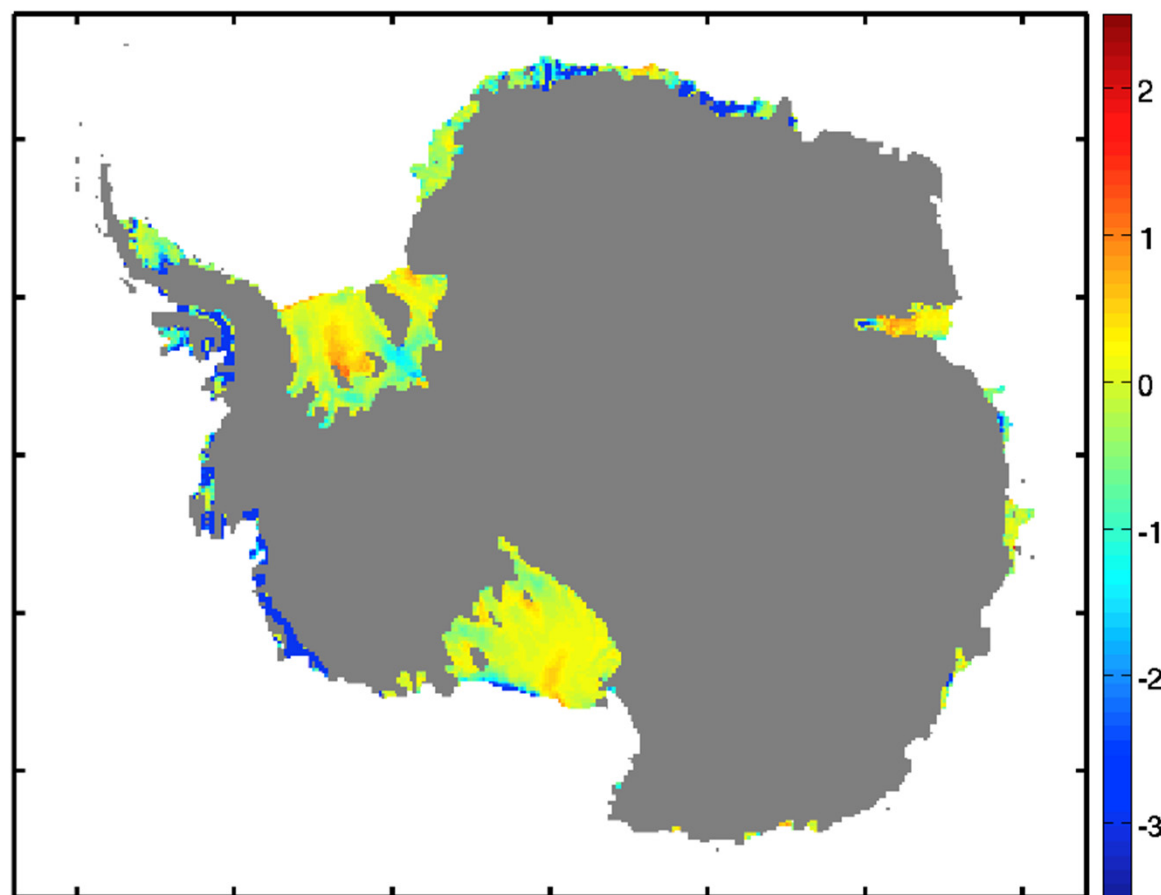
Data Assimilation.



Large Scale Ice Flow Modeling.



Mean Melt Rate dh/dt [m/a]



Freezing
 $dh/dt > 0$

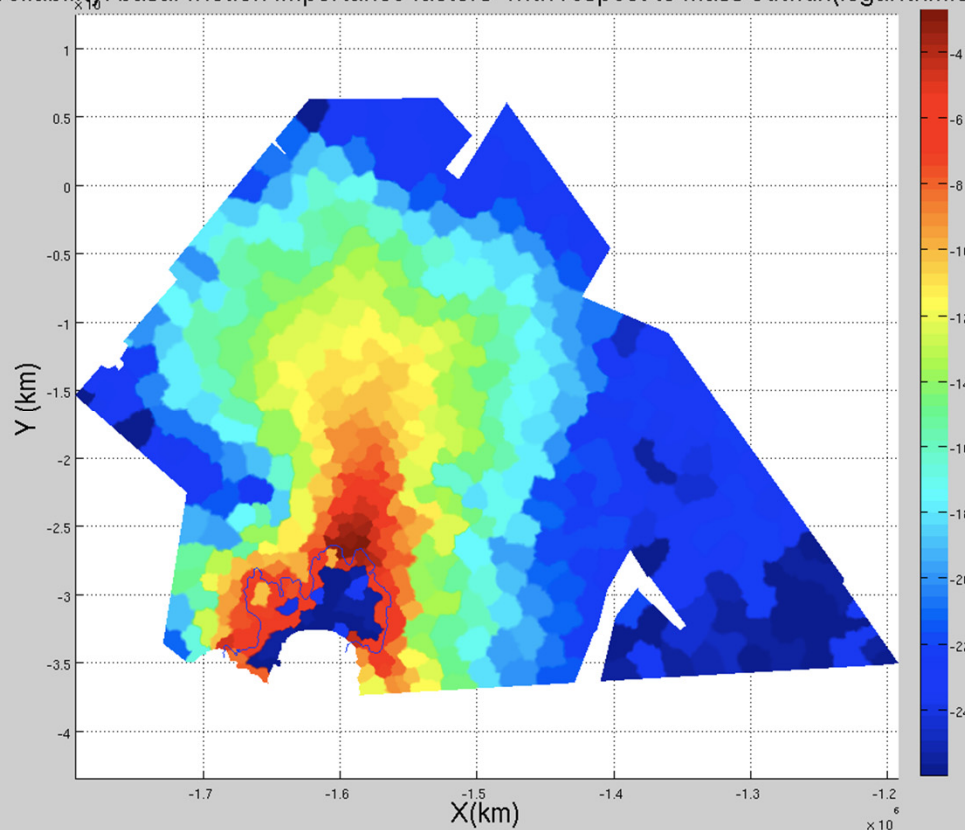
Melting
 $dh/dt < 0$

1979 - 2007

Sensitivity Analysis



Local reliability: basal friction importance factors with respect to mass outflux(logarithmic scale)



Thanks !

This work was performed at the California Institute of Technology's Jet Propulsion Laboratory under a contract with the National Aeronautics and Space Administration's Cryosphere Science Program.